

MONTHLY JOURNAL OF  
THE MUSHROOM GROWERS'  
ASSOCIATION

# MGA

## BULLETIN

NOVEMBER, 1961

NUMBER 143

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NOV. - 1961  
NUMBER 143

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## EDITORIAL

### **5TH INTERNATIONAL CONFERENCE — U.S.A. 1962**

It is true that this triennial conference is called to discuss the scientific aspects of mushroom growing but, if it follows the pattern of previous years, many of the papers will devote themselves to the more practical aspects of the industry as well as the scientific.

There is a strong feeling that the more advanced scientific papers should be grouped tightly together so that the practical grower can, if he so wishes, concentrate on practical papers which are more within his grasp.

In addition to the papers, facilities will be offered for visits to mushroom farms and it is this aspect of the visit which might prove of particular attraction to growers here.

What makes the American growers tick? Why do they seem so ahead of us in marketing? Why is it that their capital outlay per square foot appears to be so much less than ours and their farm mechanisation so much greater? Why do they still seem to favour two-floored shelf houses when growers elsewhere avoid such houses like the plague? Is it true that growers in America, receiving no more per lb. for mushrooms than we do here, can afford to shut up shop for two months in the hot weather and take a well-deserved rest? How do they manage on these prices, with wages what they are there? What part does family labour play in all this?

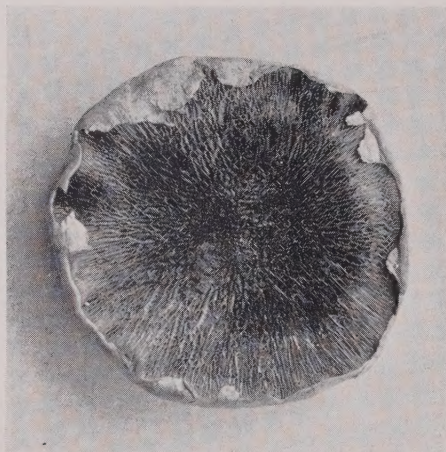
What will the trip cost? Efforts are being made to keep this within reach of a large section of growers—in the neighbourhood of £150 for a trip lasting, say, eleven days or so. Too much money? On a 10,000 sq. ft. farm producing 6 lb. of mushrooms per sq. ft. per year in three crops, with the mushrooms making 3s. 0d. per lb., an extra ounce per sq. ft. per crop would pay for the trip. Put another way, if the farm visits can provide the know-how of how to save a quarter of the number of one man's hours per annum, then again the cost of the trip would be recouped.

It will be strange indeed if this forthcoming conference in America fails to do either—or both.

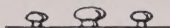
WRA

# FREAK MUSHROOM

Puzzle—Find the Stalk



J. Marston, growing mushrooms at Shelfanger, Diss, Norfolk, came across this extraordinary mushroom in September and sent it to Fred. Atkins with a note: "A freak found growing on the surface with apparently no contact with the bed". Atkins, who collects photographs of abnormal sporophores, had it photographed and here it is. He adds: "I could find no trace of a stalk, or any point at which there could have been one. Apart from severe fasciation of the gills, the mushroom was otherwise normal".



CALYPSO . . .

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# **YARMOUTH EXHIBITION & CONFERENCE**

## **Record Attendance of Members**

The considerable success which attended the Mushroom Industry Conference and Exhibition at Great Yarmouth, Norfolk, on 16th, 17th, 18th and 19th October, which was attended by a record number of members, was probably due to two outstanding factors (1) the high quality of the four speakers presenting papers and (2) the farm walk and machinery demonstration at Broadlands Mushroom Farm, Martham, which attracted about 200 people on Monday afternoon and a further seventy or so on Thursday morning.

Certainly the weather did not help in any way—gales blew almost continually throughout the four days—but this did not damp the enthusiasm of growers among whom were an unusually large number from overseas, including Canada, France, Germany, Belgium, Switzerland, Holland, Eire, Sweden, Denmark and Italy.

The number of people who paid for tickets was about 250—thirty more than the then record number of 220 at Weston-super-Mare the previous year. The total of 250 is increased to 280 when complimentary tickets are taken into consideration.

There was some criticism on the grounds that the programme was a little too crowded at times and certainly, in order to keep to schedule, there was a hectic rush from time to time and, in the end, the final lecture got under way half an hour late but, all in all, things went reasonably well from start to finish.

The innovation with regard to stands for exhibitors was well received and, at the final meeting of the standholders, it was agreed that the rope and post enclosures, instead of the orthodox and much more expensive stands, should be adhered to for future exhibitions.

Without question, the farm walk and machinery demonstration put on by Messrs. Donald and John Bradfield at their Broadlands Mushroom Farm, Martham, proved a focal point of interest. Those taking part in the demonstration included E. O. Culverwell Ltd., of Lewes, Sussex (Culverwell Manure Turner) and H. D. Steele & Son Ltd., of Worthing, Sussex (Chatsworth Colt Manure Turner), Burgess (Engineers' Supplies) Ltd., of Bracknell, Berks. (boilers and equipment), Shirley Activators Ltd., Vicarage Avenue, Battersea, S.W. 11 (Wilson Turner and Spawning Machine and a new type of Straw Cutter), Leverton Industrials of Peterborough (Hyster Q.C. 20), H. Cameron Gardner Ltd., of Reading, Berks. (Fork Lift—Tractor attachment) and A. & A. Industrial Equipment Ltd., 14 Cross Belgrave Street, Leeds (Electric Dusting Machine).

The farm itself, expanding and well laid out, was also greatly admired and the hospitality of the Bradfield Brothers was appreciated.

The "get together" at the headquarters hotel, The Carlton, on Monday evening was exceptionally well attended. The films did not come up to expectations in that the one showing Mr. J. G. Batchelor's Farm at Churt, and which was featured by the B.B.C. Television, was not accompanied by a sound track and the other, which

should have shown Messrs. Linfield's Farm at Thakeham and which has twice been shown on Southern Television's "Farm in the South" programme, was incomplete.

Any hesitation which the organizers may have felt regarding the size limitation of the Assembly Hall at the Town Hall, where the exhibition, mushroom competitions and some lectures took place, were soon dispelled on Tuesday morning. True the stands were rather on the small size and the gangways a little inadequate but throughout the day the hall was fairly crowded with growers and some standholders reported record business.

Unfortunately the mushroom competitions did not attract as many entries as usual and notable absentees were the Broadham Produce Co., of Oxted and the Monlough Food Production Co. Ltd., of Ballygowan, Belfast.

The latter, who almost swept the board last year, were most unlucky in that the plane on which their mushrooms were to have been transported was grounded by fog at Belfast. The absence of these two prominent competitors was unfortunate but, on the brighter side, the award winners were scattered far and wide which, in the long run, may well be a good thing for the competitions as a whole. Loddington Farms Ltd., of Linton, Maidstone, Kent, who have long been renowned for quality mushrooms, carried off three of the major awards and similar success attended the efforts of Coombe Bank Market Gardens Ltd. (Major A. L. A. Dredge). A popular win in the MGA Cup competition was the Broadlands Mushroom Farm whilst Edwards & Stocking took the Stable Manures Cup. The judges were drawn from MGA members, each two judges working one class only—a great improvement this, especially as regards time.

The first paper was given by **Dr. J. W. Sinden** from Gossau-Zurich, Switzerland, who was paying a welcome return visit to this annual MGA effort. In his paper on "What the Young Mushroom Grower Should Know" Dr. Sinden first of all described the Sinden-Hauser farm at Gossau, which he described as "compact and middle size" saying that, in the next 12 months a production figure of a million lb. was expected.

He was among those now relegated to the role of "Elder Statesmen", making way for "the young, the new, the unafraid and, sometimes, the unabashed". As one who had been in the industry 31 years he would advise young growers to accept new ideas but to be cautious and not be caught vainly looking for a pot of gold at the end of a rainbow. Great competition with regard to labour was confronting the industry and high wages—half production costs—would have to be paid. Compared with America, European mushroom farms, generally speaking, were ill-planned and ill-constructed and did not provide the right environment. Protection from wind was more important than anything else. At Gossau, by controlling, among other things, the air conditioning exactly, production of mushrooms was restricted to the minimum at week-ends and the maximum in mid-week when they were needed. "You must learn the physics of air, its movement, its heat



**TOP (L):** A group of visitors from overseas, at the exhibition.

**TOP (R):** Mr. A. A. Spencer and Mrs. Frank Bleazard (two of the competition judges).

**CENTRE (L):** Mr. Tom Figgis and Mr. H. Allsop, judging a competition class.

**CENTRE (R):** Some Northern growers deep in discussion at the Reception.

**BOTTOM (L):** Mushrooms Galore! Mr. John Bradfield (L), Mr. Fred. C. Atkins and Mr. G. W. Baker (almost submerged on the right) admire the splendid display of mushrooms at Broadlands Mushroom Farm.

**BOTTOM (R):** A new straw cutting machine attracted much interest at the machinery demonstration.



Dr. James W. Sinden  
(right) in conversation  
with Fred. C. Atkins.

Mr. W. L. Kavell, Nottingham,  
receives his Award.



capacity and the relationship between relative and absolute humidity" he said.

Talking of research he said he came from the hard school of American Research Scientists where results had to be proven before publication. The new vogue, with the younger element, was to propose new techniques after experiments on a few sq. ft. of beds. Growers were partly responsible for this lack of restraint. Worthwhile research was a long and tedious business, he said, adding "Research workers should be left in peace and not harried."

Speaking about publicity, Dr. Sinden said the (Hauser Concern) spent 5% of the gross turn-over on publicity, employed their own chef in their own demonstration kitchen, where he had tested some 200 recipes.

A large number of questions were asked and answered at the end of this paper and Dr. Sinden received loud applause. Mr. Graham Griffiths, MGA Chairman who presided, warmly welcomed and thanked Dr. Sinden and he also expressed thanks to Mr. G. W. Baker for his work in connection with the organizing of the conference, the ladies including Mrs. Baker and Mrs. Jones and Mrs. Allen for their help, particularly with the competitions, the brothers Bradfield for throwing their farm open to visitors, the exhibitors for supporting this annual effort, and the MGA staff.

For the lecture on Wednesday, given by **Mr. M. G. Drake** of Fibreglass Ltd., St. Helens, Lanes., Mr. Raymond Thompson was in the chair and afterwards thanked Mr. Drake for a "thoroughly workmanlike paper on insulation", pointing out that Mr. Drake had dealt with the subject from the wider angle and had not confined it to Fibreglass.

Again, after many questions, Mr. Drake found himself still answering individual queries, long after the proceedings had been declared closed.

### **Summary:**

To attempt to grow mushrooms commercially in uninsulated buildings is to court disaster. Optimum growing conditions vary with each stage of the mushroom's life cycle, but insulation in some form is needed in Peak-Heat Rooms, Spawn Running Rooms, and in Growing Houses. The paper dealt with the value of insulation, the methods of installing it, and the relative merits of various insulants for different buildings and for particular requirements.

A brief outline of the principles of heat transfer helped to show how the various insulants reduce heat losses caused by radiation, conduction and convection. The significance of a 'U' value and how to calculate it, and the comparative 'U' values of various constructions was examined in this context.

Condensation is not peculiar to the Mushroom Growing Industry, but in certain conditions (e.g., Peak-Heat Rooms) the problem becomes acute enough to deserve special attention. Methods for avoiding condensation were discussed, with particular reference to ventilation, vapour barriers and insulation: it is by the right combination of these that condensation troubles can be reduced to a minimum.

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Most mushroom farms consist of specially constructed buildings—rather than conversions—and these had priority treatment in the talk. The different requirements for Peak Heat, Spawn Running and Growing Houses were examined, bearing in mind the conditions of temperature and humidity in each case. Comparisons were made between the costs of various materials, their thermal insulation value and their use as part of the building structure. This entailed a comparison between among other things—Fibreglass, mineral wool, expanded plastic, foamed slag blocks, wood wool slabs, fibre boards, asbestos boards and aluminium foil.

The paper also dealt briefly with the conversion of existing buildings for mushroom growing, and with other general aspects of heat insulation on the mushroom farm.

The afternoon lecture session, like the others also held in the Council Chamber at the Town Hall, was taken up by **Fraulein Gerlind Eger** of the Max-Planck Institut, Hamburg, Germany. This excellent paper on casing material experiments, a summary of which appears below, was comparatively short but was accompanied by a number of illustrations. Dr. Eger, speaking in English, was fully understood, and was, at the end, as the Chairman, Dr. R. L. Edwards said, subjected to very many questions which she answered particularly well. At the end **Dr. R. von Sengbusch**, Director of the Institut and who last year gave a paper at Weston-super-Mare, added a few words on the subject and also showed a number of slides, including one of a German composting machine.

### Summary:

#### The 'Halbschalentest', A Simple Method for the Investigation of Casing Materials

The 'Halbschalentest' is executed in glass dishes with lids (10 cms. in diameter and 1 cm. high) known as 'Petri' dishes. In one half of the lower dish the mushroom mycelium is grown on sterile compost. When the mycelium has completely permeated the compost, the casing material has to be filled into that part of the lower dish which is still empty, beside the compost. Mycelium then grows into the casing material and pin-heads, strands and fruit-bodies can be observed. Details of the method were reported on. By the aid of the 'Halbschalentest' it has been proved that certain bacteria are the effective ingredients of the casing layer.

The final paper "Air in the Growing Room" was given by **Mr. C. Riber Rasmussen**, head of mushroom research in Denmark, and a frequent and welcome visitor to this country. Mr. A. St. J. Berry, Vice-Chairman of the MGA, presided and expressed thanks to Mr. Rasmussen at the close.

A summary of Mr. Rasmussen's main paper is produced herewith but he also gave a short paper dealing with some remarkable yields he has obtained in Denmark and which were described in *MGA Bulletin* No. 138 (p. 234 June, 1961).

This paper was also liberally reinforced with slides and diagrams, the later on an epidioscope, the working of which caused some delay prior to the lecture.

### Summary:

#### Air in The Growing Room

This paper discussed in simple terms a few problems related to the important factor: Air in The Growing Room. According to the latest observation, the  $\text{CO}_2$ -accumulation must be considered the prime factor to be looked at, also because we are not quite sure whether any other products of metabolism are of any importance.

Although this is not perhaps fully proved, a concentration of  $\text{CO}_2$  above  $0.15\%$ — $0.2\%$  vol., in the room air apparently does decrease cropping. But it still remains to be ascertained whether perhaps any optimum concentration can be found. It would however be reasonable to predict that even if the  $\text{CO}_2$ -content in the air was zero, it would probably not have any bad effect on the yield and this means that we can concentrate on the one problem, namely to keep the  $\text{CO}_2$ -content as low as possible, still remembering that other factors such as humidity and temperature are playing an important role in order to obtain maximum growing conditions with a given but well prepared compost.

Since **Middlebrook** and **Storey's** paper about the air/bed ratio was published, much attention has been paid to this problem but, according to newer investigations as well as practical experience and since the use of forced ventilation, the air/bed ratio is of less importance, especially when an efficient ventilation and recirculation system is used.

It is clear that by reducing air bed ratio the problem becomes bigger, but not absolutely impossible to solve.

It is mostly the possibilities for carrying out the daily routine work which determine the air bed ratio. It must however be stressed that one of the main factors influencing the yield is a room's tendency to become 'tired' (also called 'site contamination') as it gets older and in such a case ventilation seems to help but little. An effective 'cook-out' combined with a reasonable use of the recommended sterilizing agent seems to be the best solution. At farms where such procedures are used regularly, the air bed ratio is of less importance if the ventilation-recirculation system is planned carefully so as to keep the  $\text{CO}_2$ -content below the  $0.15\%$ — $0.2\%$  level, and a future design for ventilation should include the instalment of a  $\text{CO}_2$  "stat".

In this paper different problems concerning the depth of compost, watering, evaporation possibilities, air humidity, temperature, etc., are discussed: all problems which influence the accumulation of  $\text{CO}_2$  and hence the necessary ventilation and recirculation.

---

The Reception given by the Corporation of Yarmouth and held at The Garibaldi Restaurant was, like everything else connected with this exhibition and conference, exceedingly well attended.

In the absence of the Mayor of Yarmouth, the Deputy Mayor and Mayoress, Alderman and Mrs. W. E. Mobbs deputised. Before the



TOP: A general view of the Exhibition Hall during a lull in the proceedings.

BOTTOM: Four of the competition judges at work.

(L): Mr. and Mrs. Jacques Roca from Barcelona, Spain and

(R): Mr. and Mrs. H. J. Barton from Sussex.



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guests arrived, bouquets were presented to the Deputy Mayoress, the Town Clerk of Yarmouth's wife, and Mrs. Griffiths, wife of the MGA Chairman, by two members of the MGA Staff, Mrs. Wendy Garrett and Miss Rachel Owen. The guests were received by the Deputy Mayor and Mayoress, the Town Clerk and his wife and by Mr. and Mrs. Griffiths.

A particularly lively evening included a cabaret show, dancing, refreshments, etc., and was thoroughly appreciated.

The mushroom competition awards were presented by the Deputy Mayor, including the Sinden Challenge Cup for golf, won by Mr. Tony Osborne of Chichester (handicap 14). With eleven others he braved the gale on Tuesday, the competition being played at Gorleston. The organizer was Mr. J. G. Bachelor. This particular trophy, a handsome silver rose bowl, was presented by S. A. F. Sampson Ltd., of Oving, Chichester.

At the reception Mr. Griffiths, on behalf of everyone present, warmly thanked the Corporation of Yarmouth for their splendid hospitality. There were presentation boxes of chocolates for Mrs. Baker and Mrs. Jones.

Mushroom publicity was not forgotten and the window dressing competition, judged by a local hotelier, Mr. Gray, with the MGA Vice-Chairman (Mr. A. St. J. Berry) and a member of the MGA Executive, Mr. A. A. Spencer, attracted eight entries, and the first prize of £15 went to F. S. Chatters of Bells Road, Gorleston, with B. Weldon, Northgate Street, Great Yarmouth 2nd (£10); and L. & A. Stolworthy, 20 Northgate Street, Great Yarmouth 3rd (£5).

On Wednesday, at the local Electricity Board showrooms, the MGA's Cookery Adviser, Mrs. Valerie March, gave her usual competent cookery demonstration throughout the day, the attendance being 115. This demonstration attracted a great deal of favourable comment and Mrs. March deserves special congratulations. An oven-ready turkey, given by the Oven-Ready Turkey Association, and awarded for a special mushroom competition, was won by Mrs. Bloomfield, Christchurch Road, Gorleston.

Additional publicity was obtained via the local press, the *Yarmouth Mercury* running a special supplement, and by the fact that the Mushroom Exhibition and Conference was specially featured by both B.B.C. and Independent Television from Norwich.

Mr. C. R. Rasmussen and Mr. R. Dumbreck (Scotland), the latter a member of the MGA Executive, appeared on Anglia T.V., which included a film of the Blue Riband Mushroom Farm at Cromer. Dr. Sinden, Mr. G. W. Baker and Mr. D. Bradfield were all seen on the B.B.C. programme.

These arrangements and also those connected with the ladies' outing on Wednesday, were made by the MGA's Public Relations Officer, Miss Rachel Owen. The outing, in spite of the inclement weather, was much enjoyed. It included a trip on The Broads, lunch and a visit to Norwich. It was unfortunate that this outing coincided with the cookery demonstration but the demonstration had to be held on Wednesday—market day in Yarmouth.



Some of the Prizewinners

TOP: Mrs. R. L. Edwards (Edwards & Stocking)

MIDDLE: Gordon Smith (Loddington Farm)

BOTTOM: (L) Peter Dredge (Combe Bank Market Gardens Ltd.)

BOTTOM: (R) Mr. Caley

# **MUSHROOM COMPETITIONS**

## **Prize Winners**

- CLASS 1. **MGA Cup** (3 chips White Buttons) presented by Harding Bros.: 1st. Broadlands Mushroom Farm; 2nd. Kavell's Mushroom Farm.
- CLASS 2. **Mount Cup** (1 chip White Buttons) presented by Mount & Son, makers of Mount Spawn: 1st. Combe Bank Market Gardens; 2nd. Loddington Farm; 3rd. Broadlands Mushroom Farm.
- CLASS 3. **Broome & Green Cup** (1 chip White Cups) presented by Broome & Green, Covent Garden: 1st. Loddington Farm; 2nd. Combe Bank Market Gardens; 3rd. Edwards & Stocking.
- CLASS 4. **Smart Cup** (1 chip White Opens) presented by Pask, Cornish & Smart, Covent Garden: 1st. Combe Bank Market Gardens; 2nd. Edwards & Stocking; 3rd. Loddington Farm.
- CLASS 5. **Thwaites Cup** (1 chip White Buttons, 1 chip White Cups), presented by the late John Thwaites Esq.: 1st. Loddington Farm; 2nd. Broadlands Mushroom Farm; 3rd. Kavell's Mushroom Farm.
- CLASS 6. **Stable Manures Cup** (1 chip White Cups) presented by Stable Manures Ltd., Moulton, Newmarket and Worthing: 1st. Edwards & Stocking; 2nd. Kavell's Mushroom Farm; 3rd. W. & G. Caley.
- CLASS 7. **T. J. Poupart Cup** (1 chip White Buttons, 1 chip White Cups and 1 White Opens) presented by T. J. Poupart Ltd., Covent Garden: 1st. Loddington Farm; 2nd. Marigold Nurseries; 3rd. Broadlands Mushroom Farm.
- CLASS 8. **Monro Cup** (12 Mushrooms on a Plate) presented by Geo. Monro Ltd., Hertford Road, Waltham Cross, Herts: 1st. Combe Bank Market Gardens; 2nd. Edwards & Stocking; 3rd. Broadlands Mushroom Farm.

## **TRADE SHOW**

In spite of the absence of a number of old friends, the Trade Show at Yarmouth was well supported and one or two newcomers, who found room at a late hour due to the withdrawal of others, were warmly welcomed.

Those exhibiting were:— A. & A. Industrial Equipment Ltd. (Electric Dusting Machines) of Leeds; Armalines Ltd. (Rubber Bands) of Hemel Hempstead, Herts.; Bradford Fertilizer Co. Ltd. (Activators) of Gillingham, Bradford, Yorks.; Burgess & Co. (Engineers' Supplies) Ltd. (Boilers, etc.) of Bracknell, Berks.; Arthur Coomer Ltd. (Baskets)

of Farlington, Portsmouth, Hants.; W. Darlington & Sons, Ltd. (Spawn and Sundries), Worthing, Sussex; Federal Containers Ltd. (Baskets) of Agriculture House, Knightsbridge, London, S.W.1; Godson & Mallard (Sundriesmen) of Ferring, Sussex; E. Gough & Son Ltd. (Baskets) of Fishergate, Norwich; Geo. Monro Ltd. (Sundriesmen) of Hertford Road, Waltham Cross, Herts.; Rigid Containers Ltd. (Cardboard Containers) of Desborough, Kettering, Northants; S. A. F. Sampson Ltd. (Sinden Spawn Distributors), Oving, Chichester, Sussex; Shirley Organics Ltd. (Activators and Sundriesmen) of Battersea, London, S.W.11; J. E. R. Simons Ltd. (Mount Spawn) of Harlow, Essex; X-O-Matics Ltd. (Automatic Vending Machine) of Thornton Heath, Sussex, and finally the MGA's own stand which included a publicity display.

## ***PUBLICITY AND THE MUSHROOM***

### **Fierce Competition from Other Products**

Some idea of the task which confronts those who seek to publicise the cultivated mushroom, was emphasised at the Yarmouth Conference and Exhibition last month by Mr. J. McL. Morrish, Managing Director of Leedex Ltd., Public Relations Consultants to the MGA.

Speaking to a large and attentive audience Mr. Morrish pointed out that the day before Dr. J. W. Sinden of Gossau, Zurich, Switzerland, had clearly stated that he allocated 5% of his turnover to publicity and



A rather splendid picture this, taken at the Reception, with the Deputy Mayor and Mayoress (Ald. and Mrs. Mobbs) on the right, Mr. and Mrs. Graham Griffiths in the centre and Mr. Conway (Town Clerk) and Mrs. Conway on the left. The order of the day was "all smiles".

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HIGHER FERMENTATION TEMPERATURES, AND A FIRST  
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**M**ANY ADVANTAGES are gained by using Adco "M" as an activator in composting. Chief among them is the higher temperature attained both in the compost heap and in the beds during the peak heating process. Look at the results that follow from these higher temperatures.

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Secondly, you have greater assurance that your crop will be free of pests and disease. The higher temperature either kills off the pests inside the heap or drives them to the surface, where they can be dealt with by insecticides. High temperatures during fermentation are particularly vital in preventing disease such as Vert-de-gris, of which there is special danger when composting during the winter months.

## **More nourishment**

If you use Racing Stable manure, or other manure in which excess straw is present, the use of Adco "M" is strongly advised. The fermentation of this type of manure takes place more rapidly and effectively when Adco "M" is added. You get a more thorough breakdown of the strawy material, which then becomes available as food for the growing spawn. So your compost provides more nourishment for the mushrooms, and you get a bigger crop.

## **Better spawn run**

Adco "M" produces a good quality compost of even texture. It provides an

ideal medium for spawn run and helps to avoid greasy conditions, lack of aeration, and over wet compost - all of which delay mycelium growth. The spawn is able to make more rapid use of the food provided. It establishes itself more quickly and this is again a great help in preventing diseases and weed fungi. The faster the spawn grows and fills the compost the less likelihood is there of disease and weed fungi becoming serious competitors. A quick spawn growth also gives a quicker ultimate production.

You can have freedom from uncertainty in the composting process - by using Adco "M". It will pay you hands down. Adco "M" is specially formulated as a result of years of experiment, for the specific purpose of making mushroom compost. It can be used for composting with straw alone, if you wish. Or it can be used to compensate for variations in the quality and texture of your manure supply. Adco "M" provides the way to better mushroom compost every time.

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Another good strain throwing excellent quality white mushrooms, and is a long cropper, size of fruit often being maintained to the end of the crop.

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Fast mycelial growth and an early Cropper. First flush biscuit tinted, but grows whiter later. Does well at 55 F.

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Mr. Don Bradfield of Broadlands Mushroom Farm receives the MGA Cup

permanently employed a celebrated chef to demonstrate mushroom recipes.

Mr. Morrish went on:—

The mushroom industry is at present producing some 40 million lb. of mushrooms each year. This will no doubt increase annually and some talk about doubling production within the next five years. If this is done what will be the position of the industry? Will you be able to sell the increased production or will the prices which you obtain make this uneconomic?

Although you may not be faced with competition as between one brand of goods and another, you will be and indeed you are now—faced with the competition for the purse. The housewife, when she goes out shopping, has only so much money to spend. How she spends it and on what is of primary interest to a great many producers of goods—manufactured goods as well as natural products. There are increasingly many producers who set out deliberately to persuade the housewife to spend a greater share of her money on their particular products and it would seem reasonable to suggest that the mushroom industry must do likewise or else accept the fact that their share will be reduced.

I cannot believe that there is no room for expansion. At present the monthly consumption per head of population is somewhere about 1 oz.—1½ oz. ; this is hardly saturation point. But if that figure is to be increased the mushroom industry will need to set out deliberately to

persuade the housewife to buy more—not leave it to chance whether or not she does—not just hope that when she is out she will see some mushrooms and buy a quarter occasionally—but forcefully plant the idea in her mind that she wants mushrooms. Persuade her to put them on her shopping list before she goes out. And when she *is* out shopping, remind her, and keep on reminding her of that purchase.

If you do this—if you create a demand—then the retailers will respond. They will give the displays, they will stock; but until you do this you will not—nor can you expect to—secure the same sort of showing for mushrooms as say apples, tomatoes, grapes or oranges. This is a question of merchandising and sales promotion. If you create an interest in your produce and stimulate action on the part of the housewife, that must be followed through at the point of sale and the retailers will then—or should, in their own interest—capitalise on the publicity by displaying the publicity material.

At present your publicity is merely scratching the surface. It can do little else. There is no good hiding the fact that publicity schemes these days are very costly with a single 15 second T.V. commercial on all networks costing about £2,600; or £7,800 for one minute; or space for a 4" across 2 col. advertisement in the *Daily Telegraph*, *Daily Mirror*, *Daily Mail*, and *Daily Express* only once each month costing £8,744; or enough window stickers to supply one to each retailer a year costing £3,500.

All these figures may frighten you, but there are a number of organizations spending this sort of money—competing with you for the purse—continuing year after year because it pays off.

**The Oven-ready Turkey** people announced that they were spending £150,000 a year on publicity.

**The Banana Growers' Association** are spending £102,000 on television and one brand alone is supplementing this with a further £45,000 in press advertising.

**Cape Fruits** are spending £59,263 on television.

**Jaffa Oranges** are spending £50,000 on television.

**Cox's Apples** are spending £9,000 on television.

**Mediterranean Oranges** are spending £39,000 on press advertising.

**Outspan Oranges** are spending £106,000 on television and a further £40,000 on press.

**Australian Apples and Pears** are spending £16,000 on television and also using press advertising.

**Bacon Information Council** are spending £65,000 on television, £46,000 on press advertising, giving £110,000 in all.

**The Egg Marketing Board** are spending £298,533 on television.

**The Cheese Bureau** are spending £79,393 on television and £123,761 on press advertising—a total of £203,154.

**The Butter Information Council** are spending £206,429 on press advertising and £182,499 on television, totalling £388,928 in all.

I hope these figures do not bore you. I present them only to show the kind of money which has to be spent to make a real impact and also to show that others are, in fact, doing it. These figures are only

for press and T.V. advertising. In addition there is the cost of point-of-sale material, price tickets, posters and showcards, leaflets, booklets, exhibitions, demonstrations and general Public Relations.

I do not pretend that the sums of money required for a sizeable promotion are small, but I do suggest that they are not beyond the scope of this Association. With farm-gate sales worth between £6—£7 million per year a levy of 1d. per lb. of mushrooms would raise £150,000. You are used to investing—when you prepare your trays you have no guarantee as to the crop which will be gathered—but if you were able to contemplate such a fund then you could seriously set about increasing sales of mushrooms and see more clearly the way ahead.

#### Editor's Note:

Comparisons may be odious at times but there are occasions when they have to be made.

If, like the Hauser organisation in Switzerland, the U.K. growers allocated 5% of their turnover to publicity, then the annual amount available would be in the neighbourhood of £300,000.

The Oven-Ready turkey people are allocating 1d. per lb. for publicity. This, in the U.K. mushroom industry, would raise £150,000 annually.

Last year the wholesale value of oranges imported into this country from South Africa was under £7 million. Outspan oranges alone are spending £146,000 this year on T.V. and Press advertising.

Jaffa oranges are spending £50,000 on television alone—they sent (Israel) just over £7 million worth of oranges into this country last year.

What about bananas? £22 million worth were imported in 1960. Their association is spending £102,000 on T.V. and one brand, on its own, has allocated £45,000 for press publicity in the coming year.

Publicity effective publicity—costs a great deal of money. A programme lasting about six minutes publicised mushrooms and the Yarmouth Conference on Anglia T.V. At Anglia T.V. advertising rates it would have cost £700!

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## MUSHROOM SCIENCE IV

### Proceedings of the Fourth International Conference on the Scientific Aspects of Mushroom Growing.

Sales of *Mushroom Science 4*, a publication containing the fifty-seven papers given at Copenhagen in 1959 on the occasion of the Fourth International Conference on the Scientific Aspects of Mushroom Growing, have slackened off of late and a note from Mr. C. Rasmussen, President of the International Commission, urges that efforts should be made to increase sales.

When reviewing this book in *MGA Bulletin* No. 134 (February, 1961), Dr. R. L. Edwards emphasised the practical appeal of 32 of the papers, labelling 14 of the remainder as of purely academic interest and 11 as “Mixed, research with some practical bearing”.

In the final paragraph of his review Dr. Edwards wrote “*In my opinion no mushroom research worker or grower with any interest in progress can afford not to have this book*”.

Copies of *Mushroom Science 4* can be obtained from the MGA office for £3 12s. 6d. including postage.

# GROWING MUSHROOMS ON SYNTHETIC COMPOST

## Some Practical Experiments

By H. and T. von Minnigerode (West Germany)

Very often people think that synthetic compost is much more expensive than horse manure. That might be right but, taking into account all costs needed in mushroom growing, the costs of the compost materials are quite low. If you have an increase in yield of about 20% the probable extra costs are paid. By the way, the advantages of synthetic compost are known to everybody: being able to buy the materials when you like and being able to store them. The materials are fairly standard and the grower can determine, for example, the N-content of the straw by making analyses.

We were of such opinion when we began our experiments, based on the MRA reports. When using the MRA Formula in summer, the compost heated up very quickly, but in the late autumn there were difficulties in heating up. During the winter the process of composting was boosted by calf manure. This procedure of adding calf manure is to be avoided for it makes calculation more difficult.

Experiments in which we used a mixture of wheat straw and sawdust were quite satisfactory concerning the heating-up problem at the beginning, but because of the low water-holding capacity and the shortage of carbohydrates the compost gave very low yields. We could not add very much Nitrogen, for there must be an individual special ratio between N and the carbohydrates, as **Sinden** says in *Mushroom Science II*, p. 129.

Stirred by the publications of **Sinden** and **Yoder**, we made experiments with a mixture of wheat straw and hay (in America a mixture of corn cobs and hay is used) and we experienced no difficulties concerning the heating-up problem.

We put shortened wheat straw, 2"—4" in length on the composting ground and then added hay and much water. The heap was turned for the first time after two days. By this time the wheat straw and hay were well mixed by the composting machine. Water was given once more—as much as the heap would hold. After about 24 hours, the heap reached a temperature of 60 deg. C. (140 deg. F.). In order to give the compost the right start for the composting process, a high water content is necessary. During the following four days the heap was watered constantly but never to the point of leaching. We are of the opinion that the ratio of hay to wheat straw should be varied. In winter the ratio of hay to wheat straw should be 50 : 50 and in summer 25 : 75.

Because there is only a little difference between the inside temperature of the compost and the outside temperature in summer, there is only a little ventilation. That is the reason why too much hay should not be used in summer. Hay takes from the compost the ability of good ventilation. In winter there is also a good ventilation if you add quite

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a large proportion of hay because of the great difference between the inside temperature of the compost and the outside temperature. The hay gives such heat that the compost is always ready on time. As Sinden has made quite clear, soft hay should never be used. The dimensions of the heap must also be varied. After about one week of stacking the water content in our experiments was of the necessary degree. The heaps were of a brown-like colour and the straw had become softer. This interval from the time of stacking to the day '0', or adding the nutrients, takes five days; even more in really cold weather. At that time the nutrients are added, being distributed as evenly as possible. The thorough mixing was again done by the machine. In our experiments the nutrients given were those laid down by the MRA Formula. As the MRA Reports say, it is of no importance which organic Nitrogen is added. For the correct amount of Nitrogen, the N-content of the hay is of great importance.

Wheat straw ..	0.5%
Hay, excellent ..	2.4%
Hay, good ..	1.5%
Hay, not good ..	1.2%

The following shows this:—

Taking 1,000 kg. as the compost weight:—

400 kg. of good hay (1.5%)	N=6 kg. N
400 kg. wheat straw (0.5%)	N=2 kg. N

---

So the added hay saves 4 kg. N

Using the MRA Formula 150 kg. dried blood  $\times$  12% N, by using hay would result in a saving of 33 kg. dried blood.

By adding micro-elements we did not get an increase in yield.

This wheat straw/hay compost needs a 14 days composting time, having added the nutrients. For those who already use the short-composting method there would be no difficulty in using the wheat straw/hay compost, for by adding hay the compost equals horse manure.

A high water content, temperature of 70–80 deg. C. (158–175 deg. F.), small heaps and frequent turnings are necessary. At the time of filling the trays for pasteurising, the water content must be at about 75% and the pH at about 8.0–8.3. The peak heat is the usual one.

People very often think that mushrooms grown on a synthetic compost are not such a good quality as those grown on horse manure. In our experiments the quality was the same, one even on a very poor compost. It is our opinion that the quality is largely determined by good ventilation in the cropping house.

In our experiments our yield was 20% of the weight of the finished compost, which means that 10 kg./sq. m. = 2 lb./sq. ft. in fish trays during a cropping period of 7 weeks.

As we know of much higher yields in other farms we still hope that we shall succeed in reaching much better yields by learning more about the factors which directly affect production weight.

## **VENTILATION OF GROWING HOUSES**

*By V. L. Barrow, B.Sc., N.D.A.*

During the last few years there has been much improvement made in the ventilation of growing houses and in many cases changes in growing techniques have been introduced with it. Some of the improvements in cropping resulting from these changes have been, to say the least, astounding. Crop increases of 25-35% have been reported, together with better quality mushrooms. The purpose of this article is to describe some of the methods used by growers who obtained these results.

Generally speaking ventilation—meaning air change—has changed from bringing in fresh air at a low level and exhausting it at a high level to exactly the opposite. Nevertheless many growers are getting good results using the older method and new houses are still being built incorporating it.

Growers who visited Broadlands Mushroom Farm when attending the Conference and Show at Great Yarmouth must have been impressed with the yields in the new houses seen there, where this method is used. However, this article is not really to describe one best method but to describe methods that have been very successful with growers. Re-circulation within the house has become standard practice and a variety of fans and methods have been used.

All that I have read on the subject suggests that re-circulation should be done at a greater rate than air change. Also that the mushroom itself does not require the oxygen in the air as much as it dislikes carbon dioxide in its immediate environment. So surely we can then decide that any method used should remove this as efficiently as possible.

For some time now I have been testing for carbon dioxide on beds and in the atmosphere on many farms, using the efficient and convenient Draeger Gas Detector. On beds with good quality mushrooms with short stems I have generally found that the carbon dioxide content of the air was as low as 0.1%. Where long stemmed mushrooms were present the results have been 0.2% and in many cases as high as 0.4%. Often this variation was found in the same growing house.

Even then the atmosphere has shown a negligible amount of carbon dioxide. In such cases it must be assumed that the grower has been changing his air but not removing the carbon dioxide from the beds, and his method must consequently be described as inefficient. This is usually more noticeable in houses using propeller type fans which mix up the air but only pass it over a proportion—often small—of the beds in the house. Multivane fans are not expensive nor is polythene tubing, and a combination of the two has been used to direct the air to the place where it will do most good and with good effect.

FIGURE 1 is a photograph of a large growing house taken at the time of loading. By means of a Scientaire Multivane Fan air is drawn into the house near ceiling level and directed through polythene tubing



TOP: FIG. 1.

BOTTOM: FIG. 2.

### Ventilation of Growing Houses

to the far end of the house. The standard  $3' \times 2'$  trays are stacked (honeycomb method) across the house. At each alley there are perforations in the tubing and the air is drawn back to the original fan, passing over the surfaces of the trays. To assist this, an exhaust fan is placed near the floor in the wall below the first fan. This is rapidly becoming a standard method with growers.

In FIGURE 2 we see where the grower has adopted open stacking and the trays run lengthwise in the house. In this house a similar fan and tubing to that of the previous grower is used. The air is drawn to the side of the building by vents near the floor, with chimneys outside the house. The air again is intended to flow over the beds to the vents. Criticism of this method must be that re-circulation is not attempted but all air movement is directly related to air change. With ever-increasing costs of fuel, I feel that having once been heated in winter, air should be used as long as possible and only exhausted from the building when it has served its purpose.

In summer, the view must be that of air warmer than the growing temperatures that will have to be introduced to the house at a rate higher than necessary. In the case of this particular grower, his houses have far better insulation than average and consequently the heat loss in winter and the heat gain in summer will be relatively smaller than in the average growing house.

In both the above-mentioned cases it will be noticed that the loading of the house is light—meaning that the ratio between the cube of the house and the square of the growing area is high—5 : 1 in this particular case.

What would happen if the loading was increased to bring the ratio down to 4 : 1 or even 3 : 1? Would the present methods be sufficient? It is very true that just by introducing a re-circulation fan in an alley many growers have seen much improvement, but is it not possible that if a more efficient method was used still more and better mushrooms would result? The photographs that follow were taken in the house of a grower who is a heavy loader. The trays used are fish boxes and the houses, both in height and width, are loaded as full as is possible, and even the space for picking is relatively small. The ventilation system has been recently modified and the results, in cropping, have been excellent. A fan of the type previously mentioned has been installed and a large polythene tube runs the full length of the house. This fan does the re-circulation and also, by means of an adjustable vent, draws in fresh air as required. At the end of the tube a cage has been built, consisting of a wooden frame with solid board on top and on the end facing the trays. The other four faces are completely covered with fine wire gauze—the type used for screen doors in many countries. This acts as a fly trap and directs the air flow downwards and outwards. The fan draws the air to the other end of the house. Air, being a fluid, travels the line of least resistance, so barriers are erected to prevent the air travelling in any other direction except over the trays.



/      FIG. 3  
Ventilation of Growing Houses

In FIGURE 3 the box and baffle arrangement is seen, and also a film of polythene hanging from the ceiling to the top trays. Hanging from the ceiling to the floor at the entrance to the side alley are two curtains of polythene sheeting which overlap a few inches. This is a cheap and effective way of doing this and does not affect the movement of pickers, etc., in any way. It is not necessary to part the curtains with the hands. In fact, with baskets in each hand one just walks through the curtains, which yield and automatically return to position. These curtains should be placed at each end of the house and in a long house at one or two other points—as shown in FIG. 4.

The top curtain across the house should be repeated at the same place. This is illustrated in FIG. 5. In this photograph the polythene ducting which has four rectangular vents cut into it at each side can also be seen. These in turn are baffled by a piece of wire gauze hanging from wires which has the effect of distributing the air flow from the ducting.

Connected to the fans should be ducting to the floor and this should have vents at different heights.

As fresh air is drawn in so must arrangements be made for the outlet of stale air. Simple apertures at floor level fully screened, are all that are necessary. However, these should be protected outside, especially in exposed places, to stop air, at a greater pressure, being blown into the house.

I have been told that there are at least one hundred and one successful ways of growing mushrooms and there may be just as many

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FIG. 4.



FIG. 5.

#### Ventilation of Growing Houses

ways of ventilating a growing house. So in the long run the grower, by trial and error, must arrive at the method that suits his own lay-out best. Nevertheless he must aim at directing his air stream to the place where it will do most good.

Naturally enough, there must be a word or two of warning. The danger of drying out the beds must never be overlooked. A simple flush of mushrooms of one pound per square foot removes over half a gallon of water from a standard 3' x 2' tray. If the air is of low relative humidity the amount it removes can be as great as that removed by the mushrooms. This no doubt is why so many growers are now turning to air conditioning. The packaged air conditioning unit which attracted so many growers when displayed at the Great Yarmouth MGA Conference, delivers to the house air that is not only screened but at the correct relative humidity. In this way the loss of moisture from the beds is restricted to that removed by the mushroom itself.

If the air is efficiently re-circulated it will no doubt be discovered that much less fresh air need be introduced to the house. Nevertheless air change must be related to the loading ratio, depth of compost, and the variations in production of carbon dioxide during the various conditions of growth. Much of this can be overcome by having fans that are belt driven by motors instead of fans with integral motors. The rate of air movement can then be changed by changing pulleys, or in extreme cases by a change of motor. By the use of a simple gas detector such as the Draeger it is easy to check the carbon dioxide content of any part of the house, including the surfaces of the beds.



Cheap purpose-built Tray

## ***CHEAP PURPOSE-BUILT 3'x2' TRAYS***

On show at the Yarmouth Exhibition was a sample tray of Portuguese maritime pine which Mushroom Growers' Limited is recommending to all MGA members.

The tray, a picture of which is reproduced herewith, has an inside measurement of 3 ft. by 2 ft. giving a tray area of 6 sq. ft.

Trays to this exact specification have already been in use on one large tray farm in this country for as long as five years and have given excellent service—and with a fork lift truck too.

The exact specifications are: Length:  $38\frac{1}{2}$ " with sides of  $5" \times \frac{5}{8}"$ ; Width: 24" with  $7" \times 1\frac{1}{4}"$  ends; the tray bottoms are composed of five planks each measuring  $4" \times \frac{5}{8}"$ .

Quality is specified as softwood free from large or loose knots, with all parts fine sawn, square edged, thickness and measure accurate and all full size.

Present proposals are that the trays will be imported in sets (not made up) and will be completed on individual farms. By doing this a considerable saving in cost is possible for, among other things, it is possible to load as many as one thousand sets on a lorry whereas only about 400 made-up trays could be carried in one load. The charge for these trays, ex wharf and in not less than 500 lots is 8/5d. each, plus transport, and the delivery charges, ex wharf at Portsmouth, are set out herewith. Members will note the saving which can be achieved by

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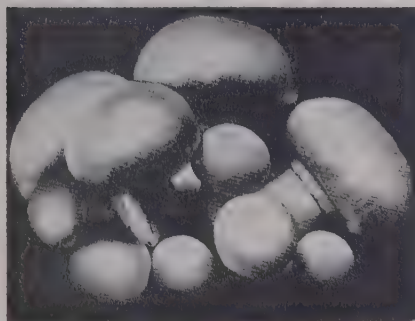
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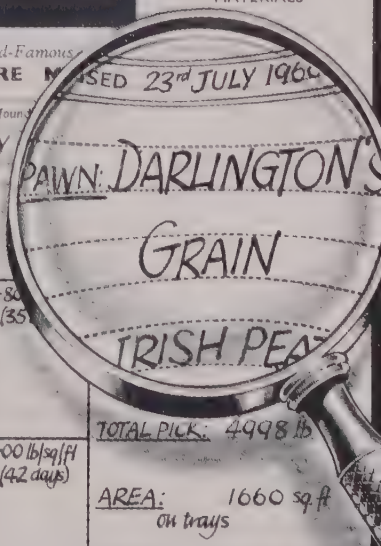
A Disease and Pest Control Chart will be found

RECEIVED 23<sup>rd</sup> JULY 1960

HOUSE NO. 5

DATE SPAWNED 13<sup>th</sup> JULY

	lb.		DAY	lb.
1	31		32	-
2	50		33	-
3	-		34	246
4	-		35	38
5	757		36	-
6	149		37	43
7	388		38	-
8	-		39	-
9	224	83 lb/sq/ft (7 days)	40	-
10	-		41	150
11	-		42	144
12	-			
13	1158			300 lb/sq/ft (42 days)
14	493			
15	-	1.95 lb/sq/ft (14 days)		
16	281			
17	-			
18	-			
19	122			
20	36			
21	81			
22	144	2.27 lb/sq/ft (21 days)		
23	45			
24	-			
25	-			
26	-			
27	249			
28	-			
29	-	2.53 lb/sq/ft (28 days)		
30	169			
31	-			



TOTAL PICK: 4998 lb

AREA: 1660 sq ft  
on trays

YIELD: 3.00 lb/sq/ft

ordering larger quantities. On 500 sets, carried 25 miles, the difference works out at a farthing per set but over a distance of 200 miles the larger quantity works out at over a 1d. per set cheaper.

Galvanized wire nails,  $2\frac{1}{2}" \times 12$  gauge, which have also been successfully tried out with this type of tray, can also be delivered with the sets if required and again a saving is possible on large quantities, as the accompanying figures show.

Some idea of the cost per tray delivered in various areas can be gauged by the following. Delivered to Bath (79 miles from Portsmouth) or London (75 miles) the cost would be 8/9d. each. At Norwich (182 miles) the figure would be 9/- and 9/1d. at Manchester (217 miles), all these figures applying to deliveries in 1,000 sets or more.

Already 10,000 sets have been sold and, as there is an eight week delivery delay, members interested are advised to place their orders, with the MGA Secretary and through Mushroom Growers' Limited, as soon as possible.

Should there be sufficient interest in trays of different sizes and provided orders of 10,000 of them can be accumulated, then every effort will be made to obtain such trays at a bulk delivery rate.

Tanalith treated, the standard sets will cost 1/6d. each extra.

Members who may require fewer trays than 500 should ask for a special quotation.

#### DELIVERY RATES, PORTUGUESE PINE MUSHROOM TRAY SETS

Mileage	A Min. 500 Sets	B Min. 750 Sets	C Min. 1,000 Sets
25	2 $\frac{1}{4}$ d.	2 $\frac{1}{4}$ d.	2d.
50	3 $\frac{7}{8}$ d.	3 $\frac{3}{4}$ d.	3 $\frac{1}{4}$ d.
75	4 $\frac{7}{8}$ d.	4 $\frac{3}{4}$ d.	4d.
100	5 $\frac{1}{2}$ d.	5 $\frac{3}{8}$ d.	4 $\frac{5}{8}$ d.
125	6 $\frac{1}{8}$ d.	5 $\frac{1}{8}$ d.	5 $\frac{1}{8}$ d.
150	6 $\frac{5}{8}$ d.	6 $\frac{1}{4}$ d.	5 $\frac{1}{2}$ d.
175	7 $\frac{1}{8}$ d.	7d.	6d.
200	7 $\frac{3}{4}$ d.	7 $\frac{5}{8}$ d.	6 $\frac{3}{8}$ d.

#### Intermediate Mileage Pro-rata

#### GALVANIZED WIRE NAILS $2\frac{1}{2}" \times 12$ gauge

2 tons	..	..	£5	3s.	8d.	per cwt.
1 ton	..	..	£5	10s.	6d.	„ „
$\frac{1}{2}$ ton	..	..	£5	14s.	0d.	„ „
4—9 cwt.	..	..	£5	16s.	9d.	„ „
1—3 cwt.	..	..	£5	18s.	6d.	„ „

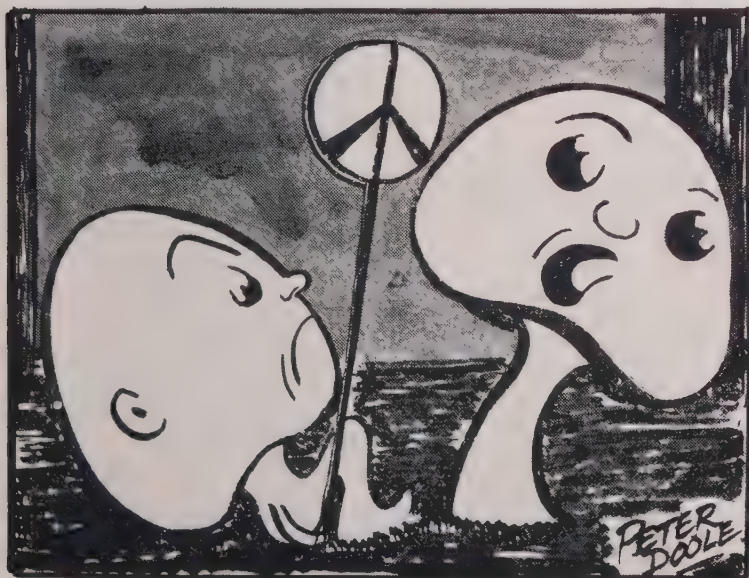
## COMMON MARKET COUNTRIES WORRIED

By Canned Mushrooms from Japan and Formosa

Mushroom growers in the Common Market, particularly those in France and West Germany who include canned and processed mushrooms in their activities, are becoming considerably alarmed over the swiftly rising exports of these commodities from Japan and Formosa.

At a meeting of representatives of Common Market growers held in Paris late in October, it was stated that canned mushrooms from Japan and Formosa were being imported into West Germany at 20% less cost than those from France and that the French stake in the West German market had dropped from 89% in 1960 to 57% in 1961. Imports from Japan stood at 0.1% in 1959, 2.9% in 1960 and 15% in 1961! Even more alarming is the fact that a complete newcomer to the West German market—Formosa—has accounted for 22% of the canned mushroom imports so far in 1961!

It was agreed at the meeting in Paris that immediate representations should be made to the appropriate authorities, requesting that some restriction should be placed on these imports without delay.



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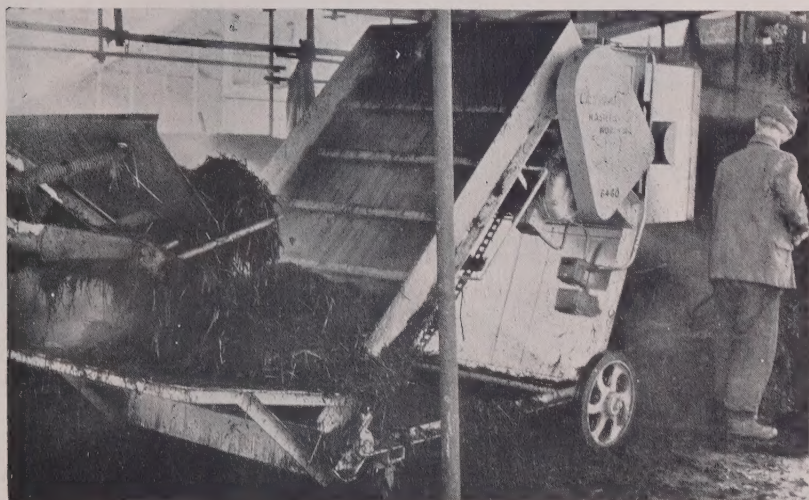
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**STERILISED SUB-SOIL** for Casing Mushroom Beds; delivered in 10-15 ton tip up loads to any part of the Country. Particulars: F. A. SMITH, Homeleaze, Staunton Lane, Whitchurch, Bristol. Tel.: Whit. 2465.

**JACKSON & LAKIN LTD.,** (Est. 1875) Wholesale Market, Nottingham, wish to contact Mushroom Growers, capable of loading daily.

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## **MUSHROOM TRAYS**

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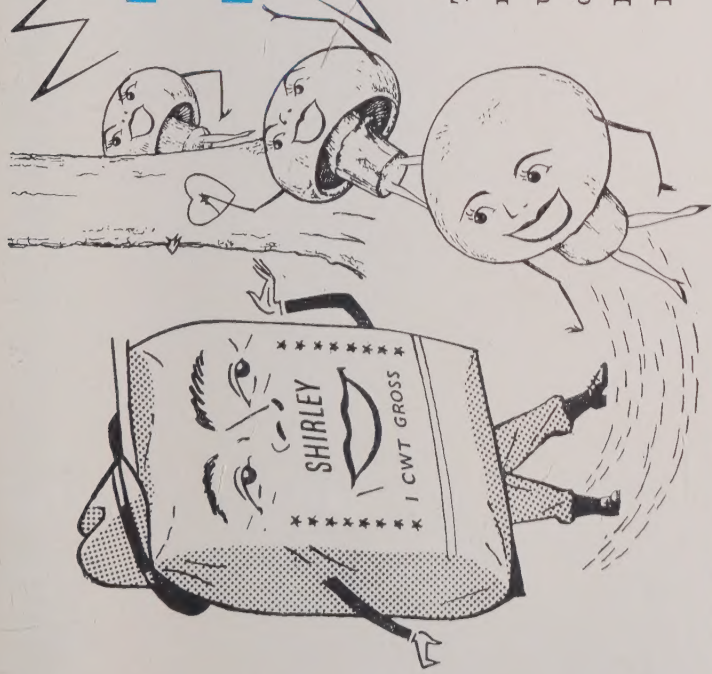
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